

***Remarks***

Reconsideration of remaining claims 44, 47, 48, 55-56, as well as newly-submitted claim 58, is respectfully requested.

In the Office action dated June 29, 2007, the Examiner objected to the drawings and specification, and rejected the pending claims under 35 USC §§ 102(b), 103(a) and 112, second paragraph. The Examiner's objections and rejections will be addressed below in the order presented in the Office action.

***Objection to the Drawings***

The Examiner first objected to the drawings in that the "hand drawn numbering of all the drawing sheets and the reference numerals found in [selected figures] are unacceptable". In response, applicant is submitting with this reply a set of replacement sheets (marked as such on each drawing sheet), having the required type of reference numerals and drawing sheet markings.

Applicant believes that these replacement sheets of drawings are satisfactory to overcome the Examiner's objections and respectfully requests the Examiner to review these drawings and find them to be acceptable.

***Objection to the Specification***

The Examiner has requested applicant to file a substitute specification in accordance with the provisions of 37 CFR 1.125(a). Enclosed with this reply is both a marked-up copy and a clean copy of the substitute specification. Applicant hereby confirms that the substitute specification contains no new matter. A separate statement affirming this statement will also be supplied.

***35 USC § 112, second paragraph Rejection – Claim 55***

Claim 55 was first rejected by the Examiner under 35 USC 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter of the present invention. In particular, the Examiner cited the limitation "the

optical simulation design tools portion” in claim 55 as lacking antecedent basis. In response, applicant has amended claim 55 to delete this phrase and, in its place, refer to the “optical design portion of the computer software”; the antecedent basis for this limitation being found in independent claim 44. Applicant believes that with this amendment claim 55 is now in allowable form and respectfully requests the Examiner to reconsider this rejection.

### **35 USC § 102(b) Rejection – Claims 44-49 and 52-56**

The Examiner rejected the above-cited claims under 35 USC 102(b) as being anticipated by the article *Numerical Simulation of a Silicon-on-Insulator Waveguide Structure for Phase Modulation at 1.3um* by Adrian Vonsovici et al. (hereinafter “Vonsovici”). The Examiner cited Vonsovici as disclosing “a method of operating a computer processor ... configured to simulate the electrical characteristics and the optical characteristics of an integrated optical/electronic circuit”, with reference to Vonsovici at page 2124 as “generating topology information and free-carrier concentration information” with respect to the “the electrical tuning of this FP interferometer” and at page 2125 as “simulating operation of at least certain optical circuits” with respect to estimating “the modulation efficiency of the reflectivity .. using the results of the optical simulations and the estimated effective index change”.

In response, applicant has amended independent claim 44 to more clearly define the method of the present invention as utilizing an EDA portion and an optical simulation design tool in a co-simulation process to “to predict the optical behavior of said SOI-based integrated optical/electronic circuit”. Simply stated, the gist of the present invention is the utilization of a single process flow within a computer processor to co-simulate the operation of an SOI-based opto-electronic device to generate data about the behavior such a device and then “extract” top-level optical parameters such as phase, extraction, chirp, extinction, and the like.

In contrast, Vonsovici provides simulation analysis of a Fabry-Perot interferometer – an active optical device. There is no discussion or suggestion in Vonsovici with respect to providing a simulation of electronic circuit components. Vonsovici does not describe or discuss the simulation of other, separate electronic

components that would be used in association with an active optical device and does not disclose or suggest any method of evaluating optical and electrical components at the same time – using computer software configured to “simulate both the electrical characteristics and the optical characteristics of an integrated optical/electronic circuit”, as defined by independent claim 44. The Vonsovici reference, it is asserted, is limited in its teaching to generating a numerical simulation of an active optical device – an SOI-based FP interferometer.

Based on the above, therefore, applicant believes that Vonsovici cannot be found to “anticipate” the subject matter of independent claim 44 (as amended), or remaining claims 47, 48, 55, 56 and 58, which depend therefrom. Applicant thus respectfully requests the Examiner to reconsider this rejection and find these claims, as amended, to be in condition for allowance.

### ***35 USC § 103(a) Rejection – Claim 50***

Claim 50 was next rejected by the Examiner under 35 USC 103(a) as being unpatentable over Vonsovici (as applied to claim 44, above), in further view of an article entitled *Integrated optical directional couplers in silicon-on-insulator* by P.D. Trinh et al, (hereinafter referred to as Trinh). The Examiner cited Trinh as teaching the utilization of WDM devices as SOI optoelectronic devices, and also teaching the simulation of such devices. The Examiner concluded that “it would have been obvious to a person of ordinary skill in the art at the time of applicant’s invention to combine the simulation and method of Vonsovici with the technology and structure of Trinh”.

As noted above, the subject matter of claim 50 has now been introduced into claim 49, with claim 50 (as well as claim 51) being cancelled from this application. Inasmuch as the pertinent portion of claim 50 remains, applicant addresses the Examiner’s rejection in the following.

In particular, applicant asserts that the combination of Vonsovici and Trinh still lacks any teaching of a method of utilizing electronic and optical design portions of computer software to simulate a combination of both electronic circuit components and optical circuit components, as defined by independent claim 44, from which claim 49

depends. Further, applicant asserts that while the Trinh mentions the ability to “realize” a variety of components used to form a “WDM network”, the body of the Trinh disclosure relates only to the simulation of a directional coupler. There is no discussion or suggestion in Trinh regarding the simulation of “the operation of the optical characteristics” of a complete WDM component, as defined in claim 49.

Applicant thus respectfully requests the Examiner to reconsider the rejection of claim 50 (now incorporated into dependent claim 49), and find amended claim 49 to be in condition for allowance.

### ***35 USC § 103(a) Rejection – Claim 51***

Lastly, the Examiner rejected claim 51 under 35 USC 103(a) as being unpatentable over Vonsovici (as applied to claim 44, above), in further view of an article entitled *Advances in Silicon-on-Insulator Optoelectronics* by B. Jalai et al, (hereinafter referred to as Jalai). The Examiner cited Jalai as teaching the importance of an evanescent coupler when building SOI-based optical/electronic circuits. The Examiner concluded that “it would have been obvious to a person of ordinary skill in the art at the time of applicant’s invention to combine the simulation and method of Vonsovici with the simulation and method of Jalai”.

Similar to claim 50 as discussed above, the subject matter of claim 51 has now been introduced into claim 49, with claim 51 being cancelled from this application. Inasmuch as the pertinent portion of claim 51 remains, applicant addresses the Examiner’s rejection in the following.

In particular, applicant asserts that the combination of Vonsovici and Jalai still lacks any teaching of a method of utilizing electronic and optical design portions of computer software to simulate a combination of both electronic circuit components and optical circuit components, as defined by independent claim 44, from which claim 49 depends. Further, applicant asserts that while the Jalai mentions the preference of evanescent coupling between an optical detector and optical waveguide (as with respect to butt coupling), there is no discussion of any “simulation” of a specific evanescent coupler structure in Jalai. Rather, the large NA of the SOI-based waveguide is cited as allowing the phenomenon of evanescent coupling to direct the propagating optical signal

into a contiguous optical detector. There is no discussion or illustration of a separate “evanescent coupler” as a separate component of the system. This is precisely the subject matter of the present invention that is now included in claim 49.

Applicant thus respectfully requests the Examiner to reconsider the rejection of claim 51 (now incorporated into dependent claim 49), and find amended claim 49 to be in condition for allowance.

### ***Newly-Submitted Claim***

Applicant is providing with this response a new claim 58, which also depends from claim 44 and further defines the types of electronic circuit components that may be simulated to define its “topology” and “free carrier concentration” in accordance with the present invention. Applicant respectfully requests the Examiner to review this new claim and also find it to be in condition for allowance.

### ***Summary***

In summary, applicant is submitting for review and approval by the Examiner the following items: (1) a set of “replacement sheet” drawings addressing the objections raised by the Examiner; (2) a marked-up substitute specification, as requested by the Examiner, incorporating the various amendments that have been made to the original specification during its pendency; (3) a “clean” copy of the same substitute specification; (4) a statement by the applicant that the substitute specification does not contain any new matter; and (5) amendments to the pending claims, as noted above, to better distinguish the subject matter of the present invention from the cited references.

Applicant believes that the case, in its present form, is now in condition for allowance and respectfully requests an early and favorable response from the Examiner in that regard. If for some reason or other the Examiner does not agree that the case is ready

to issue and that an interview or telephone conversation would further the prosecution, the Examiner is invited to contact applicant's attorney at the telephone number listed below.

Respectfully submitted,

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